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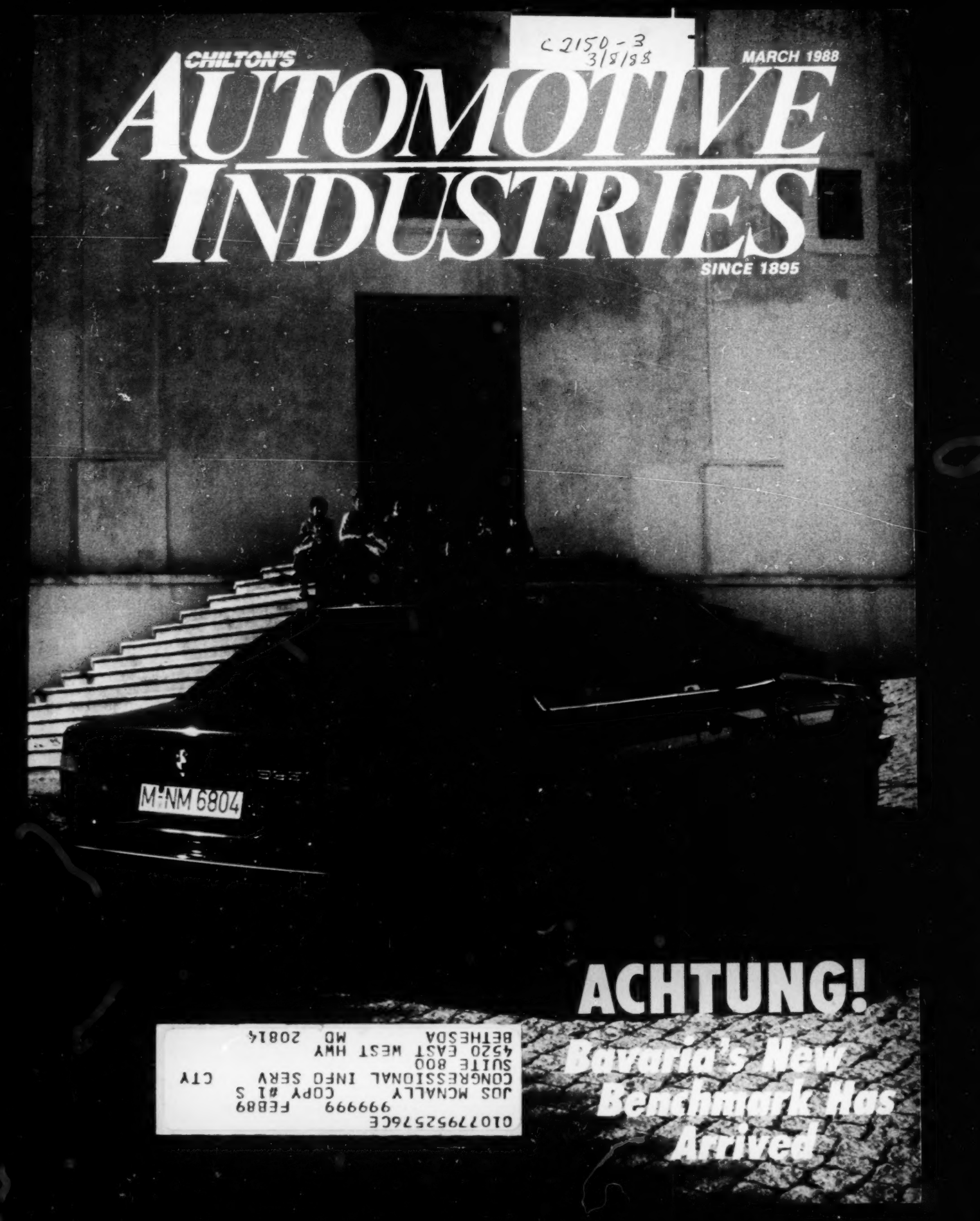

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MARCH 1988 VOLUME 168, No.3

CHILTON'S AUTOMOTIVE INDUSTRIES SINCE 1895

COVER STORY

32 **POCKET BATTLESHIP**
Once again, BMW's new 5-Series is the benchmark sporting sedan.

FEATURES

38 **QUALITY: A NEW WAY OF THINKING**
Making it happen: Part 3 of Ken Harbour's quality series.

44 **OUTSOURCING: THE DOUBLE-EDGED SWORD**
Some things an automaker should always engineer in-house.

50 **FOUR WHEEL DRIVE-IN**
All the ways all the wheels are driven in 1988.

56 **WIZARD OF AAAHS**
After 60 years, Ford's feisty Don Sullivan is still designing engines.

FACTS: FACTORY AUTOMATION/COMPUTER TECHNOLOGIES

61 **CAD, 1988 STYLE**
Superminis beget baby workstations more powerful than Mom.

69 **NEW TECHNOLOGY**
Computer-aided engineering tools optimize bumper design.

NEWS

Newsline: Hot From Chicago 7

Marketdata: Probing Japan 22

Dateline: Haaaavard, Not Yale 25

Strictly Business: Hun/DAY, Hun/DAY 27

DEPARTMENTS

Editorial 5
Only As Good As Your Training

Harbour 8
The Buck Still Starts Here

Keller 13
Detroit's Export Initiative

Callahan 16
C-P-C Battles Substance Abuse

New Products 72
Attention, AI Shoppers!

Letters 84
Spyflash!

Cover. BMW's new 5-Series captured in Portugal by Ken "Mr. Desmo" Gross. Story on page 32.

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OUTSOURCING: THE DOUBLE-EDGED SWORD

Some things an automaker should always engineer in-house

by John McElroy

"Don't even mention Getrag to me—it just makes me mad," says a powertrain engineer with over 30 years at General Motors. "We had the talent, the manpower and the resources to design a smooth-shifting five-speed gearbox right within General Motors. But some of the people running the company didn't want any part of that."

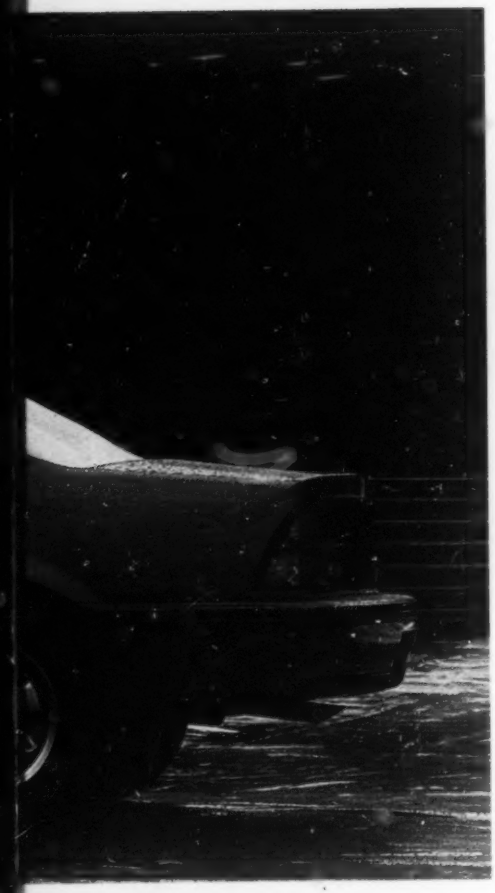
When General Motors turned to Getrag to design a manual five-speed transaxle, it left a bitter taste in the mouths of many GM engineers. Outsourcing simple parts and components is one thing, they say. But outsourcing the engineering that makes up the character of a car is another matter altogether. While auto executives like to cite the time and cost savings that outside engineering firms provide, there are others who think that outsourcing engineering has gone too far.

In The Beginning

When the American automotive industry was in its infancy, the fledgling car companies found that they needed many components and services that simply couldn't be purchased elsewhere. Whether it was research, engineering or even cost accounting, they had to build up the in-house capability to provide these services. This also gave them proprietary technology that provided their cars with unique characteristics.

After World War II and the explosive market growth that resulted from peacetime prosperity, the automakers found there were times when they couldn't keep up with the design work needed to bring out all the new products they wanted to rush to the market. So they turned to outside drafting firms to handle the spill-over. But it rarely went beyond drafting.

By the end of the 1970s, however, that all began to change. The need to



Original Chevy II, with four body styles, took only 15 months from concept to production. GM wishes it could've even come close with Corsica/Beretta.

cut costs and head-count encouraged the Big Three to do more engineering on the outside. Often the automakers found that outside engineering firms were more in tune with the latest technology. These firms were also able to develop new products much faster than the bureaucracy-ridden staffs at GM, Ford and Chrysler.

As a result, today Detroit is literally booming with outside engineering firms that are getting more and more design work to do. But why are these outside firms able to operate so much more efficiently?

"You have to ask whether the work you do is an end or a means," explains Hulki Aldikacti, president of Entech, an engineering firm in Troy, MI. "Let's say we start a hardware store. Our job is to sell hardware. Then we decide we need to do bookkeeping to keep track of all our parts. That is a means.

"So we decide to hire our cousin who is real good with computers," continues Aldikacti. "We make him department head and before you know it he needs an assistant. But we're in the business to sell hardware, not to run computers. So then we find there is a company that is selling services to do books much cheaper. That is their end.

"Whenever you drive for an end, you're efficient," he maintains. "But whenever something is a means, and you put it under your roof, I guarantee it will become a bureaucracy and inefficient."

The Dangers Of Outsourcing

At the rate the American automakers are outsourcing their engineering work, the total annual market for outside engineering will grow to $1 billion by 1990, if it's not there already. Yet, efficiency alone is not the driving force behind this move.

"Outsourcing gets you to specialists who work the job on a daily basis," says Warren Hirshfield, who recently moved from Cadillac to become general manager of SDRC's automotive services. "Whereas an auto company might do a new body every five years, the pure engineering houses do that work on a more regular basis."

Because of the efficiency and expertise these firms offer, it is difficult to find a top-level executive at one of the Big Three who feels that outsourcing is bad for the company. In fact, they welcome the trend.

"Right now, we're moving very, very fast," reasons Bob Stempel, president of General Motors. "And I want all the technology. I want everything done not one after another, but side by side. Isn't it wonderful to have all that technology simultaneously?"

Yet once you step a few rungs down the management ladder, there are more than a few people who feel uncomfortable with the trend to outsourcing engineering.

"Can an auto company let everything be outsourced and just be an assembler?" asks SDRC's Hirschfield. "I worry about that. There's got to be limits because you can carry that too far."

But why would anyone be concerned about turning their engineering over to companies that can do it faster, cheaper and better?

"Once you move outside with many businesses doing your engineering, it begins to level off the differentials that separate one car from another. The more fragmented the designs of all these components becomes, the less character a car will have. And it's the cars that have the most character that are the best in the long run," notes Alex Mair, ex-VP of GM's Technical Staffs, now retired.

Maintaining Brand Image

The reason outside engineering firms can't design the identity of a car is because character cannot be boiled down to an engineering specification.

"How do you define the difference between a Ford, a Cadillac and a Mercedes? Mechanically, they're identical," states Hulki Aldikacti. "If I make a parts list, they have four wheels, they have an engine, and axles and seats and a steering wheel. When you

break them down to a parts list, you can't tell a Cadillac from a Mercedes. But when you see a Cadillac, you know it's a Cadillac."

The character that defines what makes a Cadillac comes from the "Private Knowledge" of the people at Cadillac, Aldikacti explains. Private Knowledge, he says, is a reflection of each company's own distinctive culture. It can't be written in a book, it can't be taught, it can't be digitized – and it can't be outsourced. The only way you can absorb it is by working at the company over many years.

According to the experts *AI* contacted for this story, the most important feature that determines the character of a car is its styling, both interior and exterior. But it also involves the performance of the powertrain – right down to the exhaust note. It includes the seat design and positioning, as well as the subjective feel of all the controls, and whether they should be rotary knobs, push buttons or toggle switches. It even includes the proper 'ker-chunk' of a closing door. All these features, including development and tuning, define what makes one marque different from another.

"Look at how good Honda's shift effort is," Alex Mair points out. "They didn't just design a good shift lever. They designed the whole powertrain as a package. You can't buy an engine from one company, a transmission from another and a clutch from another and get that shift effort."

Faster And Cheaper?

It's only when you get to the things that don't relate to the character of a car, the wheel bearings or the alternator for example, that you can safely outsource the engineering, these experts say. These non-critical items are what Aldikacti calls Public Knowledge.

"Designing the air-conditioning system is Public Knowledge, but deciding if you should have air conditioning, that's Private Knowledge. It's like building a house," he adds. "You tell the builder what you want: Private Knowledge. And he builds it to your specifications: Public Knowledge."

When the top executives at the US automakers explain why they're turning engineering work over to outside firms, invariably the conversation turns to cutting development time and costs. But is it really cheaper to outsource this engineering work?

Anyone who has visited any of the major outside engineering firms that ring Detroit has undoubtedly run across engineers from the Big Three stationed there. Some firms even have reserved parking spaces for these engineers. Oddly, even though these outside firms have been given a job to do, the job just can't seem to get done unless an automaker devotes a small staff to work there. Yet, the cost of this staff is never factored into the outsourcing "savings."

A retrospective look at what Detroit was able to achieve in the past shows that the US industry used to execute programs much more quickly. After all, the US industry used to be famous for its annual styling change. And it used to turn out cars even faster than the Japanese do today.

JAPAN'S ENGINEERING ADVANTAGE

No Wonder Japanese Cars Are So Well Engineered!

COMPANY	ENGINEERS
GM (N.A.)	14,000
FORD (N.A.)	10,000
CHRYSLER	6000
HONDA	12,000
TOYOTA	20,600*
NISSAN	8400*

*Includes subsidiaries
N.A. North America

"The original Corvette took only 12 months from concept to production," notes Alex Mair. "The '55 Chevy took 22 months. The Chevy II, which had four body styles and went into five plants took only 15 months!"

Mair also feels that outsourcing engineering programs could actually hinder a car company from shortening its cycle times. "How will management manage all these outside firms?" Mair asks. "They have to divide their staffs just to monitor the progress of these outside design firms.

"The reason the automakers can't be as fast as they were in the past is that they have too many people not involved in designing and building cars," he explains. "Plus, they have too many meetings and presentations. Why, when I started at General Motors, the only place you were allowed to meet was in the halls! And when Ed Cole was at Chevrolet, he had them re-engineer the escalators so they would go faster."

While the US automakers see outsourcing as the way to get engineering work done faster, cheaper and better, the Japanese automakers seem to think exactly the opposite.

"Consider our basic philosophy: We must always carry our torch by our own hands. We must develop fresh ideas on our own. We must not copy others. We must respect the value of research," says Shoichiro Irimajiri, president of American Honda Manufacturing and designer of some of Honda's most famous racing and production engines.

American executives point out that the Japanese outsource most of the engineering of their components. On a superficial level that's true. But virtually every major Japanese automaker holds equity in its first-tier suppliers. And all of these, in turn, are physically grouped around the automaker they supply. This relationship provides the Japanese automakers with a level of vertical integration that virtually matches GM's.

The Japanese automakers also have more engineers than the American car companies (see chart), which means that they design, in-house, *far more* of the critical factors that define the character of a car.

Recently, Honda developed its own Anti-Lock Brake (ALB) system, even though it could have readily bought an ABS system from Bosch or Teves. And Toyota designed and manufactures the turbocharger used on the Supra Turbo, even though it could have bought it from a handful of other firms.

Obviously, these are items that both Honda and Toyota felt were part of their distinctive character and shouldn't be designed or built on the outside.

Not surprisingly, some industry observers think that the Japanese model indicates what will happen in the US. The need to keep distinct personalties in cars will drive the Big Three to do a better job of what they want up front in the concept stage. And it may well force them to solve their timing and cost problems, rather than managing them through outsourcing.

"In the ultimate, I think this design work will come back in-house," predicts Alex Mair. AI